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EXAMINER

DAY, HERNG DER

ART UNIT	PAPER NUMBER
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2128

NOTIFICATION DATE	DELIVERY MODE
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05/22/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/619,796	Applicant(s) CANNING, FRANCIS X.	
	Examiner HERNG-DER DAY	Art Unit 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-14, 17-24 and 30-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-14, 17-24, and 30-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is in response to Applicant's Amendment and Response ("Amendment") to Office Action dated March 5, 2009, filed May 5, 2009. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

1-1. Claims 9, 23, and 42-44 have been amended. Claim 26 has been canceled. Claims 9-14, 17-24, and 30-44 are pending.

1-2. Claims 9-14, 17-24, and 30-44 have been examined and rejected.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 9-14, 17-20, 22-24, 33-41, and 44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3-1. Claim 9 recites the limitation, "said more than one substantially sparse block" in lines 16-17 of the claim which is vague and indefinite because it is unclear whether "said more than one substantially sparse block" is referred to "more than one substantially sparse block" as recited in line 4 of the claim or "more than one substantially sparse block" as recited in line 16 of the claim. Furthermore, claim 9 recites the limitation, "said sub-blocks" in line 12 of the claim. There is insufficient

antecedent basis for this limitation in the claim when “said processor means is further configured to identify one [[or more]] sub-block[[s]] in said block-sparse matrix” as recited in lines 7-8 of the claim. Clarification of the metes and bounds, via clearer claim language, is requested.

3-2. Claim 13 recites the limitation, “said sub-blocks” in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim when “said processor means is further configured to identify one [[or more]] sub-block[[s]] in said block-sparse matrix” as recited in lines 7-8 of claim 9.

3-3. Claim 19 recites the limitation “said matrix of disturbances” in line 2 of the claim which is vague and indefinite because it is unclear whether “said matrix of disturbances” is referred to “a matrix of disturbances” as recited in line 2 of claim 17 or “a matrix of disturbances” as recited in line 3 of claim 18.

3-4. Claim 20 recites the limitation “said matrix of disturbances” in line 2 of the claim which is vague and indefinite because it is unclear whether “said matrix of disturbances” is referred to “a matrix of disturbances” as recited in line 2 of claim 17 or “a matrix of disturbances” as recited in line 3 of claim 18.

3-5. Claim 22 recites the limitation, “said system of linear equations” in lines 15-16, 18, 24-25, and 27-28 of the claim which is vague and indefinite because it is unclear whether “said system of linear equations” is referred to “a system of linear equations” as recited in line 3 of the claim or “a system of linear equations” as recited in line 6 of the claim. Claim 22 also recites the limitation, “said transformed system of linear equations” in lines 23-24 of the claim which is vague and indefinite because it is unclear whether

“said transformed system of linear equations” is referred to “a second system of linear equations” as recited in line 16 of the claim or something else. Furthermore, claim 22 recites the limitation, “wherein a portion of said second system of linear equations *is compressed* relative to said system of linear equations” in lines 17-18 of the claim which is vague and indefinite because, as recited in lines 13-14 of the claim “each of said composite sources comprising a linear combination of one [[or more]] of said original basis function[[s]]”, it is unclear how “said second system of linear equations *is compressed*” if each composite source is a linear combination of a different one of said original basis function unless some of the composite sources are a linear combination of only the same original basis function respectively. Clarification of the metes and bounds, via clearer claim language, is requested.

3-6. Claim 23 recites the limitation, “said interaction data” in line 7 of the claim which is vague and indefinite because it is unclear whether “said interaction data” is referred to “interaction data” as recited in line 1 of the claim or “interaction data” as recited in line 5 of the claim. Clarification of the metes and bounds, via clearer claim language, is requested.

3-7. Claim 32 recites the limitation, “wherein said energy sources *comprise* pressure disturbances” in lines 1-2 of the claim. However, as described in the last fourth line of page 7 in the specification, “Many physical phenomena involve sources that *generate* a disturbance”. In other words, the specification only discloses that a source may *generate* a disturbance. Accordingly, the recited “energy sources *comprise* pressure

disturbances” is vague and indefinite. Clarification of the metes and bounds, via clearer claim language, is requested.

3-8. Claims not specifically rejected above are rejected as being dependent on a rejected claim.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 9-14, 17-24, and 30-44 are rejected under 35 U.S.C. 101 because the inventions as disclosed in claims are directed to non-statutory subject matter.

5-1. Claims 9-14, 17-24, and 30-44 are directed to the manipulation of abstract ideas of modeling electromagnetic effects, computing physical sources, data compression or factorization, by applying decomposition and/or composite sources. This claimed subject matter lacks a practical application of a judicial exception (abstract idea) since it fails to produce a useful, concrete, and tangible result.

As stated in the MPEP 2106 (IV)(C), “Likewise, a claim that can be read so broadly as to include statutory and nonstatutory subject matter must be amended to limit the claim to a practical application. In other words, if the specification discloses a practical application of a section 101 judicial exception, but the claim is broader than the disclosure such that it does not require a practical application, then the claim must be rejected.” and “Thus, a claim that recites a computer that solely calculates a mathematical formula (see Benson) or a computer disk that solely stores a

mathematical formula is not directed to the type of subject matter eligible for patent protection.” Also, as stated in the MPEP 2106.02, “If the “acts” of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. *Gottschalk v. Benson*, 409 U.S. 63, 71 - 72, 175 USPQ 673, 676 (1972). Thus, a process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.”

5-2. Specifically, as described in the specification in lines 19-20 of page 8, “The terms “sources” and “physical sources” are used herein to include all types of actual and/or fictitious sources.” Therefore, the claimed subject matter is directed to the manipulation of abstract ideas including those fictitious sources (e.g., a number, formula, expression, magnetic current, etc.) and/or the effect of those fictitious sources without involving the transformation of any physical object or substance, or an electronic signal representative of any physical object or substance. In other words, the claimed subject matter is so abstract such that it does not provide or require a practical application.

5-3. On the other hand, as disclosed in the specification in lines 14-20 of page 45, “in addition to electromagnetic fields, the techniques described above can also be used to compress interaction data for physical disturbances involving a heat flux, an electric field, a magnetic field, a vector potential, a pressure field, a sound wave, a particle flux, a weak nuclear force, a strong nuclear force, a gravity force, etc. The techniques described above can also be used for lattice gauge calculations, economic forecasting,

state space reconstruction, and image processing (e.g., image formation for synthetic aperture radar, medical, or sonar images).” In other words, the claimed subject matter is seeking to patent substantially every application of the abstract idea of data compression or factorization by applying decomposition and/or composite sources.

5-4. Furthermore, the claimed subject matter does not produce a tangible result because the claimed subject matter fails to produce a result that is limited to having real world value rather than a result that may be interpreted to be abstract in nature as, for example, a thought, a computation, or manipulated data. More specifically, the claimed subject matter includes applying decomposition and/or composite sources to compute electric currents, to produce the strengths of energy sources or physical disturbances, or to compute a solution (comprising physical sources including fictitious sources) of a system of equations. This produced result remains in the abstract and, thus, fails to achieve the required status of having real world value. In other words, the claimed subject matter is consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, describing sources (including *fictitious* sources), disturbances, and/or the effect of those sources, and thus, is nonstatutory because the manipulation on abstractions (e.g., *fictitious* sources) just can not produce a tangible result.

5-5. Regarding process claims, in claim 21, Applicant recites “each original source corresponding to an energy source” in line 7 of the claim and “using said decomposition on a computing system to solve said transformed system of linear equations to produce the strengths of said energy sources” in lines 23-24 of the claim. In claim 23, Applicant

recites “using interaction data to compute physical sources” in lines 1-2 of the claim and “using said decomposition to compute a solution of said system of equations, said solution comprising said physical sources” in lines 12-13 of the claim. However both “energy sources” and “physical sources”, including fictitious sources, and “to produce the strengths of said energy sources” involve no transformation of any physical object or substance, or an electronic signal representative of any physical object or substance. See *Bilski* 88 USPQ2d at 1399. Dependent process claims recite various energy sources and physical sources and involve no transformation of any physical object or substance, or an electronic signal representative of any physical object or substance neither. In other words, there is no evidence in the process claims of transformation of any physical object or substance, or an electronic signal representative of any physical object or substance and, therefore, fails the transformation test.

5-6. Independent process claims also recites “a computer processor”, “a computing system”, or “a computer”. However, as evidenced above, the operation on “a computer processor”, “a computing system”, or “a computer” involves no transformation of any physical object or substance, or an electronic signal representative of any physical object or substance. In other words, the claimed operation is consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, which have been recited as, for example, data describing the strengths of energy sources (including fictitious sources) or interaction data. Therefore, the recited “computer processor”, “computing system”, or “computer” is not a particular apparatus

but a general purpose apparatus for manipulating numbers and abstract ideas and, therefore, fails the machine test too.

Applicant's Arguments

6. Applicant argues the following:

6-1. Response to Objection of Claim 9

(1) "Claim 9 has been modified to replace "locations locations" by "locations"."

(Page 8, paragraph 3, Amendment)

6-2. Response to Rejection of Claims 9-14, 17-20, 26 and 40-44 Under 35 U.S.C. 112 Second Paragraph

(2) "Applicant has clarified Claim 9 to recite "to compute electric currents" rather than "to find electric currents"". (Page 8, paragraph 6, Amendment)

(3) "Applicant asserts that relatedness between the recited device and the recited electric current is described by the recited use of the matrix on a processor and by embodiments described in the specification that use such a matrix to describe electromagnetic effects due to an electric current." (Page 8, paragraph 7, Amendment)

6-3. Response to Rejection of Claim 26 Under 35 U.S.C. 112 Second Paragraph

(4) "Claim 26 has been canceled." (Page 9, paragraph 1, Amendment)

6-4. Response to Rejection of Claims 42-44 Under 35 U.S.C. 112 Second Paragraph

(5) "Claims 42-44 have been amended to correct the antecedent basis issues identified by the Examiner." (Page 9, paragraph 2, Amendment)

6-5. Response to Rejection of Claims 9-14, 17-24, 26 and 30-44 Under 35 U.S.C. 101

(6) “Thus, in this context Applicant argued (in his response of February 9, 2009) that if a physical effect was computed using fictitious sources, then it is clear that the fictitious sources are used to describe a physical effect. Numerous examples of the use of such sources to produce physical results were given in the specification.” (Page 10, paragraph 1, Amendment)

(7) “The correct analysis does not inquire whether it is possible to apply one of the several claimed steps in a way that does not produce a claimed result. The correct analysis is to notice whether the specification enables the claimed result. Numerous embodiments within the specification describe how to use fictitious sources to compute real physical effects.” (Page 10, paragraph 2, Amendment)

Response to Arguments

7. Applicant’s arguments have been fully considered.

7-1. Applicant’s argument (1) is persuasive. The objection of claim 9 in Office Action dated March 5, 2009, has been withdrawn.

7-2. Applicant’s arguments (2) - (5) are persuasive. The rejections of claims 9-14, 17-20, 26 and 40-44 under 35 U.S.C. 112, Second Paragraph, in Office Action dated March 5, 2009, have been withdrawn.

7-3. Applicant’s arguments (6) and (7) are not persuasive. Applicant argued “if a physical effect was computed using fictitious sources, then it is clear that the fictitious sources are used to describe a physical effect.” However, it is also possible that the fictitious sources may be used to describe abstract ideas because the “physical effect”

and “fictitious sources” have not been specifically *defined* in the specification and, thus, the arguments are not persuasive. For the purpose of claim examination with the broadest reasonable interpretation, the Examiner will interpret the “physical effect” as the “effect of *physical source*”. As described in the specification in lines 19-20 of page 8, “The terms “sources” and “physical sources” are used herein to include *all types of actual and/or fictitious sources*.” Therefore, a “physical source” could be, for example, a number, a formula, an expression, etc., and is not limited to, for example, a magnetic current or an electric charge. In view of the specification, the “physical effect” will be further interpreted as the “effect of all types of actual and/or *fictitious sources*”.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Herng-der Day whose telephone number is (571) 272-3777. The Examiner can normally be reached on 9:00 - 17:30.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: (571) 272-2100.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kamini S. Shah can be reached on (571) 272-2279. The fax phone numbers for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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/Kamini S Shah/
Supervisory Patent Examiner, Art Unit 2128

/Herng-der Day/
Examiner, Art Unit 2128

May 18, 2009